

CLAIMS

1. A variant archaeal DNA polymerase having a modified amino acid sequence of a wild-type amino acid sequence, the modified sequence being in the amino-terminal amino acids that comprise a uracil-binding pocket in the wild-type polymerase whereby the variant polymerase has reduced affinity for uracil than the wild-type polymerase.
2. A variant archaeal DNA polymerase according to claim 1 having a modified amino acid sequence of wildtype polymerases selected from *Thermococcus gorgonarius* (Tgo-Pol), *Thermococcus litoralis* (Tli-Pol), *Thermococcus sp. 9°N-7* (9°N-7-Pol), *Desulfurococcus* strain Tok (DTok-Pol), *Pyrobaculum islandicum* (Pis-Pol), *Archaeoglobus fulgidus* (Afu-Pol), *Sulfolobus acidocaldarius* (Sac-Pol), *Sulfurisphaera ohwakuensis* (Soh-Pol), *Sulfolobus solfataricus* (Sso-Pol), *Pyrodictium occultum* (Poc-Pol) or *Aeropyrum pernix* (Ape-Pol).
3. A variant archaeal DNA polymerase according to claim 1 having a modified amino acid sequence of wildtype *Pyrococcus furiosus* DNA polymerase (Pfu-Pol),
4. A variant archaeal DNA polymerase according to claim 3 having modifications in amino acids 1-40 or amino acids 78-130.
5. A variant archaeal DNA polymerase according to claim 4 of SEQ ID NO.2 having modifications to amino acids 7, 36, 37, 90-97 or 112 – 119.

6. A variant archaeal DNA polymerase according to claim 5 having modifications to amino acids Y7, Y37, V93, I114 or P115.

7. A variant archaeal DNA polymerase according to claim 5 wherein the modification is Y7A.

8. A variant archaeal DNA polymerase according to claim 5 wherein the modification is Y37A.

9. A variant archaeal DNA polymerase according to claim 5 wherein the modification is V93Q.

10. A variant archaeal DNA polymerase according to claim 5 wherein the modification is V93R.

11. A variant archaeal DNA polymerase according to claim 5 wherein the modification is I114R.

12. A variant archaeal DNA polymerase according to claim 5 wherein the modification is I114Q.

13. A variant archaeal DNA polymerase according to claim 5 wherein the modification is P115Δ.

14. A variant archaeal DNA polymerase according to claim 4 of SEQ ID NO.1 having modifications to amino acids 8, 37, 38, 91-98 or 113 – 120.

15. A variant archaeal DNA polymerase according to claim 14 having modifications to amino acids Y8, Y38, V94, I115 or P116.

16. A variant archaeal DNA polymerase according to claim 14 wherein the modification is Y8A.

17. A variant archaeal DNA polymerase according to claim 14 wherein the modification is Y38A.

18. A variant archaeal DNA polymerase according to claim 14 wherein the modification is V94Q.

19. A variant archaeal DNA polymerase according to claim 14 wherein the modification is V94R.

20. A variant archaeal DNA polymerase according to claim 14 wherein the modification is I115R.

21. A variant archaeal DNA polymerase according to claim 14 wherein the modification is I115Q.

22. A variant archaeal DNA polymerase according to claim 14 wherein the modification is P116Δ.

23. A variant archaeal DNA polymerase according to any preceding claim having modifications in the amino acid motif: E - - I - F/Y- - - Y- - D.

24. A nucleic acid molecule encoding an archaeal DNA polymerase according to any one of claims 1 – 23.

25. A method of amplifying DNA comprising the steps of (i) denaturing a double strand of DNA by heating a solution containing the DNA, free oligonucleotides, primers and a variant archaeal DNA polymerase as defined in any one of claims 1 - 23; (ii) reducing the temperature of the solution to effect annealing of the primer and the DNA and (iii) heating the solution to effect extension of DNA by the variant polymerase.

26. A kit useful for polymerase chain reactions comprising a variant archaeal DNA polymerase as defined in any one of claims 1 - 23 and optionally DNA to be amplified, free bases and primers.